Trend Study 15-13-04

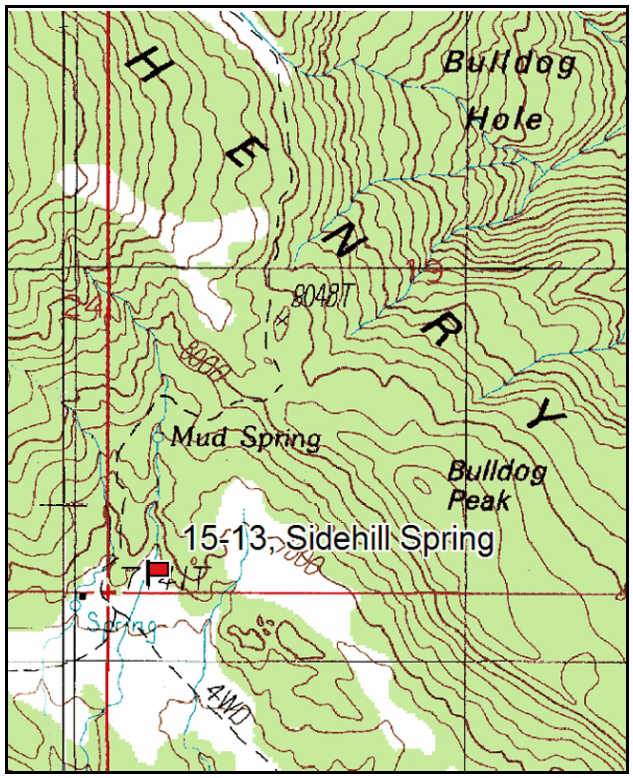
Study site name: Sidehill Spring . Vegetation type: Mountain Big Sagebrush .

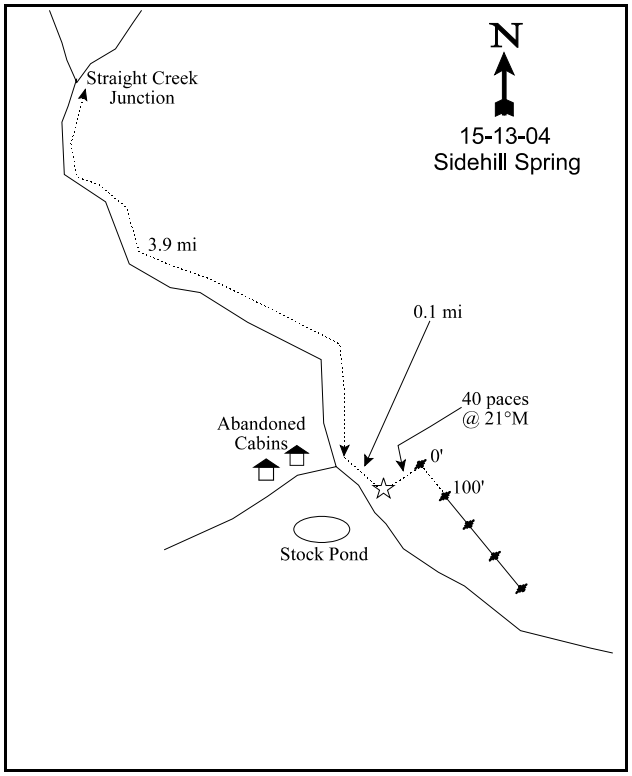
Compass bearing: frequency baseline 170 degrees magnetic.

Frequency belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From Straight Creek Junction (T33S, R10E, Sec. 12), proceed south on the main road for 0.3 miles to Straight Creek. Continue 3.6 miles to a minor fork by a spring, stock pond and some abandoned cabins. Bear left on the main road, cross a small wash and less than 0.1 miles into the sage flat where a witness post for the transect is found on the left side of the road. The study area is northeast of the witness post. The 0-foot stake has browse tag #472 attached, and is 40 paces away at a bearing of 21°M from the witness post.





Map Name: Cass Creek Peak

Diagrammatic Sketch

Township 33S , Range 11E , Section 19

GPS: NAD 27, UTM 12S 4196186 N, 522194 E

DISCUSSION

Sidehill Spring - Trend Study No. 15-13

The Sidehill Spring study is located one-half mile west of Bulldog Peak and halfway between Mt. Pennell and Mt. Hillars. The elevation at the site is 7,740 ft and the slope is gradual (4-5%) with a southeast aspect. This area was a sagebrush flat surrounded by a pinyon-juniper/oak woodland with young trees scattered throughout the flat, but it burned in 2003 in the Bulldog fire. The site was seeded and chained by the BLM to rehabilitate the area after the fire. The area is within the Pennell Allotment. Water is available for livestock and wildlife in a nearby spring, creek, and stock pond. This was considered a key area for mule deer during the summer and during mild winters, but after the fire there was very little browse available for deer. The 1999 pellet count data estimated 18 deer days use/acre (44 ddu/ha) and 25 cow days use/acre (63 cdu/ha). The pellet group transect data from 2004 showed only about 1 deer days use/acre (3 ddu/ha). There is evidence of past mining activity; a cabin, pump house, and old mining equipment is located near the spring.

The soil is a fairly deep loam soil with an estimated effective rooting depth of over 15 inches. Soil penetrometer readings used to estimate a stoniness profile index, indicated few rock within the profile. Almost all penetrometer readings were to the beginning of a clay hardpan. There was very little rock or pavement on or near the soil surface, about 5-8%. Black sagebrush was present in small scattered patches on the site before the burn indicating that at least some rocky and/or shallow hardpan exists within the soil profile. Some active gullies were noted in 1999. In 2004 erosion was rated a slight, with some erosion around the 0 and 200-foot stakes. Organic matter content is moderate at 2%. Phosphorus and potassium levels are near normal or above for normal plant development. The soil is slightly alkaline (pH of 7.4).

A dense stand of mostly mountain big sagebrush dominated the site prior to the 2003 Bulldog wildfire. Sagebrush density had been increasing with each sampling date to 5,920 plants/acre in 1999. Cover of sagebrush was relatively stable at nearly 19% in 1994 and 1999. Use was mostly light and vigor was good on the majority of the sagebrush. Percent decadency declined to 12% by 1999. After the fire density was only 520 young plants/acre. Seedlings were abundant with an estimated 1,560/acre. Sagebrush was not seeded here, but fourwing saltbush was and was noted in the tracks of the bulldozers. The only other shrub to be sampled was stickyleaf low rabbitbrush which has the potential to quickly increase after fire.

Perennial grasses had only 1.5% cover in 1994 and 2.2% in 1999. During this period of time, cheatgrass increased from less than 1% to almost 17% cover (an obvious fire hazard). After the fire in 2003 and the fire rehabilitation, cheatgrass had only 2% cover and had significantly lower nested frequency than both 1994 and 1999. Perennial grass cover was 8.6% in 2004 and much more abundant. Crested wheatgrass, intermediate (pubescent and tall) wheatgrass, Russian wildrye, Indian ricegrass, alfalfa, and Lewis flax were all seeded. Nested frequency for perennial forbs have also increased since the fire, but annual forbs have increased as they usually do following a major disturbance like a fire. They should decrease in time with competition from the perennial component of the herbaceous understory.

1994 TREND ASSESSMENT

Basic ground cover estimates were similar to those of 1987. Erosion is occurring on the site, nevertheless it does not appear to be severe. Continued increases in the shrub component will tend to accelerate erosion problems on this site. Trend for soil is currently stable. The browse population on this site is relatively dense. There are a combined total of 15,020 shrubs/acre on this site. Mountain big sagebrush and rabbitbrush account for 97% of that total. Both populations appear healthy with low percent decadency and dynamic biotic and reproductive potentials. Trend for browse is stable at this time, but an increase in decadency of sagebrush and rabbitbrush will likely occur in the future as the intraspecific and interspecific competition becomes more intense when coupled with continued drought. The herbaceous component is severely limited due to the

abundance of shrubs. Sum nested frequencies of perennial grasses have declined slightly, while those of perennial forbs increased. Nested frequency of silky lupine increased by 36%. Overall, trend for herbaceous understory is up but still deficient of perennial grasses which noted a slight drop in their nested frequency values. Thinning of sagebrush and rabbitbrush would be required before a more substantial improvement of the herbaceous understory is realized.

TREND ASSESSMENT
soil - stable (3)
browse - stable (3)
herbaceous understory - up slightly (4)
winter range condition (DC index) - 52 (fair) Mountain big sagebrush type, mostly because of the depleted herbaceous understory.

1999 TREND ASSESSMENT

Trend for soil continues to be stable. The increase in cheatgrass brome decreased the amount of bare soil, while increasing herbaceous vegetative cover. Erosion is evident at the site with pedestaling around shrub stems, however some of the gullies at the site appear to be healing with herbaceous cover. Trend for the key browse, mountain big sagebrush, is stable. Percent decadency decreased from 29% in 1994 to 12% currently. Use is mostly light and vigor is good on most plants. The main negative indicator for sagebrush is the high proportion of decadent plants classified as dying (53%). However, recruitment from young plants is good at 14% and should provide enough incoming individuals to offset the loss of those that are dying. Trend for the herbaceous understory is down. The annual cheatgrass is by far the dominant species and is rapidly increasing over the site. Also, the quadrat and sum of nested frequencies for perennial grasses and forbs decreased in 1999.

TREND ASSESSMENT
soil- stable (3)
browse- stable (3)
herbaceous understory- down (1)
winter range condition (DC index) - 46 (poor) Mountain big sagebrush type, mostly because of the depleted herbaceous understory and the negative impact of the increase in cheatgrass.

2004 TREND ASSESSMENT

Trend for soil is down now because of the fire causing percent bare soil to more than triple to over 60%. The browse trend is also obviously down with all the mature browse being lost to the wildfire. Currently there are a few young mountain big sagebrush plants on the area (520 plants/acre). After fire rehabilitation perennial grass cover has increased to almost 9%, while cheatgrass cover has gone from almost 17% down to about 2%. Nested frequency for perennial forbs have also increased since the fire, but annual forbs have increased as they usually do following a major disturbance like a fire. They will decrease in time with competition from the perennial component of the herbaceous understory if there is not a significant grazing disturbance in the spring and early summer. Trend for the herbaceous understory is upward. The DCI rated this site as fair and the improvement is due to the increase in the perennial herbaceous understory, but the browse component was lost.

TREND ASSESSMENT
soil- down (1)
browse- down (1)
herbaceous understory- up (5)
winter range condition (DC index) - 56 (fair) Mountain big sagebrush type,

HERBACEOUS TRENDS --
Management unit 15 , Study no: 13

Type	Species	Nested Frequency				Average Cover %		
		'87	'94	'99	'04	'94	'99	'04
G	Agropyron cristatum	a-	a-	a-	b75	-	-	1.84
G	Agropyron intermedium	a-	a-	a-	b89	-	-	2.33
G	Agropyron spp.	9	-	-	-	-	-	-
G	Agropyron spicatum	-	-	-	3	-	.01	.00
G	Agropyron trachycaulum	a-	a-	a-	b69	-	-	1.83
G	Bouteloua gracilis	-	4	3	3	.00	.00	.15
G	Bromus carinatus	a-	a-	a-	b41	-	-	.98
G	Bromus tectorum (a)	-	b163	c326	a55	.80	16.80	2.17
G	Dactylis glomerata	-	-	-	5	-	-	.18
G	Elymus junceus	a-	a-	a-	b18	-	-	.45
G	Hilaria jamesii	2	-	-	-	-	-	-
G	Oryzopsis hymenoides	b33	a13	ab16	a10	.13	.17	.07
G	Poa interior	-	4	2	-	.03	.00	-
G	Sitanion hystrix	c138	c138	b88	a13	1.36	1.94	.75
G	Stipa lettermani	-	6	1	-	.01	.03	-
Total for Annual Grasses		0	163	326	55	0.80	16.80	2.17
Total for Perennial Grasses		182	165	110	326	1.55	2.16	8.63
Total for Grasses		182	328	436	381	2.35	18.97	10.81
F	Achillea millefolium	a-	a-	a-	b22	-	-	.77
F	Astragalus spp.	-	-	-	3	-	.00	.01
F	Castilleja linariaefolia	-	-	3	-	-	.41	-
F	Calochortus nuttallii	a7	b54	b41	a11	.14	.29	.03
F	Chenopodium album (a)	-	-	-	2	-	-	.18
F	Chenopodium leptophyllum(a)	-	a-	a-	b17	-	-	1.94
F	Gayophytum ramosissimum(a)	-	ab9	a-	b17	.02	-	.47
F	Ipomopsis aggregata	b11	a-	a-	a-	-	-	-
F	Lappula occidentalis (a)	-	4	-	4	.01	-	.18
F	Linum lewisii	a5	a3	a-	b17	.00	-	.28
F	Lomatium spp.	-	3	6	-	.03	.06	-
F	Lupinus sericeus	b58	c160	b71	a14	4.92	2.67	.78
F	Lygodesmia spinosa	-	-	-	8	-	-	1.21
F	Medicago sativa	-	-	-	8	-	-	.51
F	Nicotiana attenuata (a)	-	a-	a-	b10	-	-	.49
F	Penstemon comarrhenus	5	2	4	2	.00	.02	.15
F	Penstemon spp.	-	-	-	-	-	-	.00

Type	Species	Nested Frequency				Average Cover %		
		'87	'94	'99	'04	'94	'99	'04
F	Phlox longifolia	$_{b}$12	$_{a}$-	$_{ab}$5	$_{c}$72	-	.01	.83
F	Polygonum douglasii (a)	-	$_{a}$-	$_{a}$-	$_{b}$33	-	-	1.62
F	Ranunculus testiculatus (a)	-	-	-	6	-	-	.01
F	Solanum triflorum (a)	-	-	-	2	-	-	.89
F	Sphaeralcea coccinea	-	-	1	2	-	.15	.21
F	Zigadenus paniculatus	-	6	-	-	.01	.01	-
Total for Annual Forbs		0	13	0	91	0.02	0	5.80
Total for Perennial Forbs		98	228	131	159	5.11	3.63	4.80
Total for Forbs		98	241	131	250	5.14	3.63	10.60

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --
Management unit 15 , Study no: 13

Type	Species	Strip Frequency			Average Cover %		
		'94	'99	'04	'94	'99	'04
B	Amelanchier utahensis	2	2	0	.03	-	-
B	Artemisia nova	0	2	0	-	.41	-
B	Artemisia tridentata vaseyana	93	89	15	19.32	18.78	.30
B	Atriplex canescens	0	0	2	-	-	-
B	Chrysothamnus viscidiflorus viscidiflorus	77	66	10	6.09	7.08	.26
B	Juniperus osteosperma	0	5	0	4.61	7.52	-
B	Opuntia spp.	5	5	0	.00	.00	-
B	Pinus edulis	0	3	0	1.61	2.62	-
B	Quercus gambelii	0	0	1	-	-	-
B	Rosa woodsii	0	0	1	-	-	-
B	Symphoricarpos oreophilus	10	7	1	.33	.18	.00
Total for Browse		187	179	30	32.02	36.63	0.57

CANOPY COVER, LINE INTERCEPT --
Management unit 15 , Study no: 13

Species	Percent Cover	
	'99	'04
Artemisia tridentata vaseyana	-	.11
Atriplex canescens	-	.18
Chrysothamnus viscidiflorus viscidiflorus	-	.08
Juniperus osteosperma	3.79	-
Pinus edulis	3.40	-
Symphoricarpos oreophilus	-	.16

POINT-QUARTER TREE DATA --
Management unit 15 , Study no: 13

Species	Trees per Acre	
	'99	'04
Juniperus osteosperma	29	-
Pinus edulis	17	-

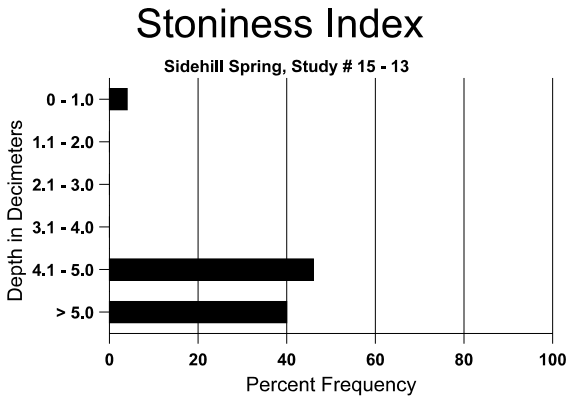
Average diameter (in)	
'99	'04
4.5	-
4.5	-

BASIC COVER --
Management unit 15 , Study no: 13

Cover Type	Average Cover %			
	'87	'94	'99	'04
Vegetation	7.25	40.99	53.78	20.81
Rock	.25	2.09	1.99	4.44
Pavement	2.00	.50	.99	3.35
Litter	62.75	32.65	39.14	10.51
Cryptogams	0	.18	.38	0
Bare Ground	27.75	25.28	24.26	68.29

SOIL ANALYSIS DATA --
Management unit 15, Study no: 13, Study Name: Sidehill Spring

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	ds/m
15.4	61.0 (16.4)	7.3	37.6	37.8	24.6	2.1	13.6	252.8	0.6



PELLET GROUP DATA --
Management unit 15 , Study no: 13

Type	Quadrat Frequency		
	'94	'99	'04
Rabbit	19	24	19
Elk	1	-	1
Deer	12	5	3
Cattle	-	2	-

Days use per acre (ha)	
'99	'04
-	-
-	-
18 (44)	1 (3)
25 (63)	-

BROWSE CHARACTERISTICS --
Management unit 15 , Study no: 13

		Age class distribution (plants per acre)					Utilization					
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
Amelanchier utahensis												
87	**0**	-	-	-	-	-	0	0	-	-	0	-/-
94	**60**	-	-	60	-	-	33	0	-	-	0	17/143
99	**40**	-	-	40	-	-	0	0	-	-	0	48/44
04	**0**	-	-	-	-	-	0	0	-	-	0	25/48
Artemisia nova												
87	**1533**	1733	733	800	-	-	9	0	-	-	17	9/8
94	**0**	-	-	-	-	-	0	0	-	-	0	-/-
99	**60**	-	-	60	-	40	0	0	-	-	0	19/31
04	**0**	-	-	-	-	-	0	0	-	-	0	-/-
Artemisia tridentata vaseyana												
87	**4799**	466	2266	2400	133	-	26	0	3	-	17	20/19
94	**5600**	3020	840	3120	1640	-	2	.71	29	9	9	51/54
99	**5920**	240	800	4400	720	1300	2	0	12	6	6	24/36
04	**520**	1560	520	-	-	280	0	0	0	-	0	14/26

		Age class distribution (plants per acre)					Utilization					
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
Atriplex canescens												
87	**0**	-	-	-	-	-	0	0	-	-	0	-/-
94	**0**	-	-	-	-	-	0	0	-	-	0	-/-
99	**0**	-	-	-	-	-	0	0	-	-	0	-/-
04	**60**	60	60	-	-	-	0	0	-	-	0	14/8
Cercocarpus montanus												
87	**0**	-	-	-	-	-	0	0	-	-	0	-/-
94	**0**	-	-	-	-	-	0	0	-	-	0	-/-
99	**0**	-	-	-	-	-	0	0	-	-	0	-/-
04	**0**	-	-	-	-	-	0	0	-	-	0	12/9
Chrysothamnus viscidiflorus viscidiflorus												
87	**11332**	200	3866	7466	-	-	0	0	0	-	4	4/8
94	**8340**	3960	720	7520	100	-	.47	.23	1	-	0	31/22
99	**11000**	200	1400	9540	60	-	0	0	1	.18	.18	5/10
04	**340**	-	-	340	-	-	0	0	0	-	0	7/9
Gutierrezia sarothrae												
87	**866**	-	66	800	-	-	0	0	-	-	0	9/5
94	**0**	-	-	-	-	-	0	0	-	-	0	-/-
99	**0**	-	-	-	-	-	0	0	-	-	0	-/-
04	**0**	-	-	-	-	-	0	0	-	-	0	-/-
Juniperus osteosperma												
87	**0**	-	-	-	-	-	0	0	-	-	0	-/-
94	**0**	-	-	-	-	-	0	0	-	-	0	-/-
99	**100**	-	-	100	-	-	0	0	-	-	0	-/-
04	**0**	-	-	-	-	20	0	0	-	-	0	-/-
Opuntia spp.												
87	**132**	133	66	66	-	-	0	0	-	-	0	4/7
94	**200**	-	80	120	-	-	0	0	-	-	0	5/16
99	**100**	-	-	100	-	-	0	0	-	-	0	4/7
04	**0**	-	-	-	-	-	0	0	-	-	0	7/7
Pinus edulis												
87	**0**	-	-	-	-	-	0	0	-	-	0	-/-
94	**0**	-	-	-	-	-	0	0	-	-	0	-/-
99	**60**	-	20	40	-	-	0	0	-	-	0	-/-
04	**0**	-	-	-	-	60	0	0	-	-	0	-/-

		Age class distribution (plants per acre)					Utilization					
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
Quercus gambelii												
87	**0**	-	-	-	-	-	0	0	-	-	0	-/-
94	**0**	-	-	-	-	-	0	0	-	-	0	-/-
99	**0**	-	-	-	-	-	0	0	-	-	0	-/-
04	**40**	-	-	40	-	-	0	0	-	-	0	25/19
Rosa woodsii												
87	**0**	-	-	-	-	-	0	0	-	-	0	-/-
94	**0**	-	-	-	-	-	0	0	-	-	0	-/-
99	**0**	-	-	-	-	-	0	0	-	-	0	-/-
04	**20**	-	-	20	-	-	0	0	-	-	0	10/13
Symphoricarpos oreophilus												
87	**0**	-	-	-	-	-	0	0	0	-	0	-/-
94	**260**	20	40	180	40	-	15	0	15	-	0	9/46
99	**280**	-	160	120	-	-	0	0	0	-	0	17/24
04	**40**	-	-	40	-	-	0	0	0	-	100	15/36